

Deep River/ Turkey Creek Watershed Plan
City of Hobart, Indiana
--Final Plan--
June 2002

III. Understanding Designated Uses, Water Quality Standards, Basin Assessments, and Problem Pollutants

In order to identify water quality problems in the Deep River/ Turkey watershed, stakeholders in the watershed planning process felt that readers of this plan needed to understand the basis for measuring or quantifying water quality problems. Consequently, this section of the Deep River/ Turkey Creek Watershed Plan provides a technically detailed discussion of how water quality standards, the measures of quality in rivers, streams, and lakes, are developed and used to protect the quality of Indiana's surface waters. This section of the plan will also briefly discuss the programs actively monitoring water quality within the watershed and explain the process used to assess the quality of surface waters in the Deep River/ Turkey Creek watershed.

Understanding Designated Uses and Water Quality Standards

Rivers, streams, and lakes have naturally occurring plants, animals, and microorganisms that break down, or consume, water quality contaminants. This process, in conjunction with the rate and volume of stream flow, oxygen levels, temperature, and other naturally occurring conditions dictates the rate at which streams are able to breakdown and absorb contaminants. Historically, many waterbodies have received more contaminants than they could naturally absorb. Waterbodies that received more contaminants than they can absorb are considered to be polluted.

In order to prevent waterbodies from becoming polluted, in 1972, Congress established the Clean Water Act and the National Pollutant Discharge Elimination System (NPDES) to regulate the discharges of pollutants into lakes, rivers, and streams from industrial and municipal wastewater treatment plants, and other direct sources of pollution. The NPDES Program uses water quality standards and discharge limitations to restrict the introduction of contaminants that would exceed a waterbody's ability to naturally absorb and consume a pollutant.

In order to determine appropriate discharge limitations for a NPDES regulated facility, the State of Indiana first established designated uses and water quality standards to support those uses for the waters of the State. Indiana's current designated uses for surface waters are described in **Table 3-1**.

A water quality standard is the combination of a designated use (i.e. swimmable or fishable) and a narrative or numeric water quality criterion designed to protect that use (i.e. an ammonia discharge limit of 3.0mg/L or an E. coli discharge limit of 125 cfu/100ml). Designated uses and resulting water quality standards form

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the foundation for the NPDES program to control the amount of pollutants being discharged into the rivers, streams, and lakes of Indiana.

In Indiana, effluent limitations are implemented through NPDES permit conditions established by the Indiana Department of Environmental Management (IDEM). Effluent limitations are designed to limit the quantities, discharge rates, and concentrations of pollutants that are discharged, from “point sources” of pollution. These limitations represent the minimum effluent quality or quantity that must be achieved prior to discharge of a treated wastewater into a waterbody (river, stream, or lake). The NPDES permits issued by the IDEM contain specific effluent limits designed to meet the State’s water quality standards.

Great Lakes Initiative (GLI) Standards

In 1995, the Environmental Protection Agency (EPA) and States in the Great Lakes region agreed to develop a comprehensive plan to restore the health of the Great Lakes. In order to facilitate consistent implementation of water quality improvements in the Great Lakes Region, the EPA developed “The Final Water Quality Guidance for the Great Lakes System”, also known as the Great Lakes Initiative. **Figure 3-2** illustrates the GLI area and the States involved in the GLI.

During 1995, Indiana began the process of creating regulations within the Great Lakes Basin to incorporate the various criteria and procedures identified in EPA’s guidance into Indiana’s water quality standards. As a part of this rulemaking process, Indiana also developed procedures to implement an antidegradation policy for all substances discharged to waters into the Great Lakes Basin. These revisions were adopted by the Indiana Water Pollution Control Board in February 1997 and were submitted to USEPA for approval. The GLI has resulted in the development of more stringent criteria for the use of 29 pollutants, including bioaccumulative chemicals of concern, and prohibited the use of mixing zones for these toxic chemicals.

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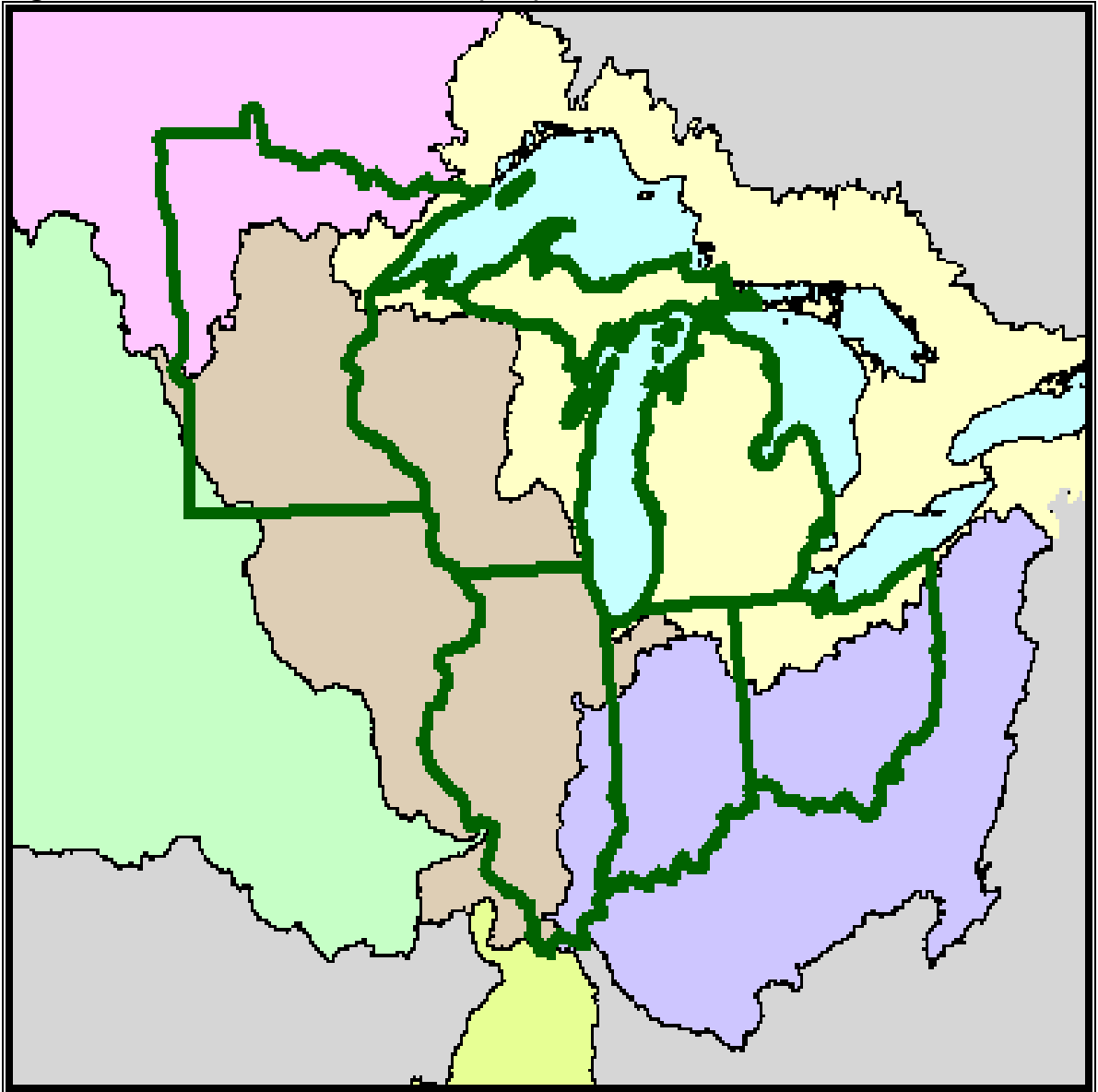
Table 3-1: Surface Water Use Designations and Classifications

The following uses are designated by the Indiana Water Pollution Control Board (327 IAC 2-1-3):

- Surface waters of the state are designated for full-body contact recreation during the recreational season (April through October).
- All waters, except limited use waters, will be capable of supporting a well-balanced, warm water aquatic community.
- All waters, which are used for public or industrial water supply, must meet the standards for those uses at the point where water is withdrawn.
- All waters, which are used for agricultural purposes, must meet minimum surface water quality standards.
- All waters in which naturally poor physical characteristics (including lack of sufficient flow), naturally poor or reversible man-induced conditions, which came into existence prior to January 1, 1983, and having been established by use attainability analysis, public comment period, and hearing may qualify to be classified for limited use and must be evaluated for restoration and upgrading at each triennial review of this rule.
- All waters, which provide unusual aquatic habitat, which are an integral feature of an area of exceptional natural beauty or character, or which support unique assemblages of aquatic organisms may be classified for exceptional use.
- All waters of the state, at all times and at all places, including the mixing zone, shall meet the minimum conditions of being free from substances, materials, floating debris, oil, or scum attributable to municipal, industrial, agricultural, and other land use practices, or other discharges:
 - that will settle to form putrescent or otherwise objectionable deposits,
 - that are in amounts sufficient to be unsightly or deleterious,
 - that produce color, visible oil sheen, odor, or other conditions in such degree as to create a nuisance,
 - which are in amounts sufficient to be acutely toxic to, or to otherwise severely injure or kill aquatic life, other animals, plants, or humans, or
 - which are in concentrations or combinations that will cause or contribute to the growth of aquatic plants or algae to such degree as to create a nuisance, be unsightly, or otherwise impair designated uses.

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Figure 3-1: Great Lakes Initiative (GLI) Area and States



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The 305(b) Process – Assessing Indiana’s Watersheds

In order to assess the effectiveness of a State’s water quality standards, effluent limitations, and NPDES permitting program, Section 305(b) of the Clean Water Act (CWA) requires each State to develop a program to monitor the quality of its waters and prepare a report describing their quality. This process of monitoring and assessment produces an evaluation of the degree to which each waterbody supports a State's designated uses and water quality standards. Each waterbody assessed is rated as supportive, partially supportive, or not supportive of it's designated uses. **Table 3-1** illustrates the criteria used by the IDEM for assessing a waterbody’s ability to support its designated uses.

TABLE 3-2: CRITERIA FOR EVALUATING DESIGNATED USE SUPPORT*

Parameter	Fully Supporting	Partially Supporting	Not Supporting
Aquatic Life Use Support			
Toxic Pollutants	Metals were evaluated on a site by site basis and judged according to magnitude of exceedance and the number of times exceedances occurred.		
Conventional Inorganic Pollutants	There were very few water quality violations, almost all of which were due to natural conditions.		
Benthic aquatic macroinvertebrate Index of Biotic Integrity (mIBI)	mIBI \geq 4.	mIBI < 4 and \geq 2.	mIBI < 2.
Qualitative habitat use evaluation (QHEI)	QHEI \geq 64.	QHEI < 64 and \geq 51.	QHEI < 51.
Fish community (fIBI) (Lower White River only)	IBI \geq 44.	IBI < 44 and \geq 22	IBI < 22.
Sediment (PAHs = polynuclear aromatic hydrocarbons. AVS/SEM = acid	All PAHs \leq 75 th percentile. All AVS/SEMs \leq 75 th percentile.	PAHs or AVS/SEMs > 75 th percentile. (Includes Grand Calumet River and Indiana Harbor	Parameters > 95 th percentile as derived from IDEM Sediment Contaminants

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volatile sulfide/ simultaneously extracted metals.)	All other parameters \leq 95 th percentile.	Canal sediment results, and so is a conservative number.)	Database.
Indiana Trophic State Index (lakes only)	Nutrients, dissolved oxygen, turbidity, algal growth, and sometimes pH were evaluated on a lake-by-lake basis. Each parameter judged according to magnitude.		
Fish Consumption			
Fish tissue	No specific Advisory*	Limited Group 2 - 4 Advisory*	Group 5 Advisory*
* Indiana Fish Consumption Advisory, 1997, includes a state wide advisory for carp consumption. This was not included in individual waterbody reports because it obscures the magnitude of impairment caused by other parameters.			
Recreational Use Support (Swimmable)			
Bacteria (cfu = colony forming units.)	No more than one grab sample slightly > 235 cfu/100ml, and geometric mean not exceeded.	No samples in this classification.	One or more grab sample exceeded 235 cfu/100ml, and geometric mean exceeded.

***From Indiana Water Quality Report for 1998**

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Participants in the 305(b) Process

In Indiana, the primary agencies involved in collecting, analyzing, and assessing surface water quality data for the state's 305(b) report are as follows:

1. Indiana Department of Environmental Management (IDEM), Office of Water Quality, Assessment Branch – River Basin Monitoring Program

The Water Quality Assessment Branch of the Office of Water Quality (OWQ) is responsible for assessing the quality of water in Indiana's lakes, rivers and streams for the state's 305(b) Report. In 1995, in response to the growing demand for more and better water quality data, the IDEM Water Assessment Branch developed a Surface Water Quality Monitoring Strategy. The strategy was designed to direct the efforts of the Assessment Branch in the light of increased workloads, as well as new 305(b) reporting guidelines to states from the Environmental Protection Agency (EPA).

IDEM's monitoring strategy was crafted to provide technical data and information to support the 305(b) report, the NPDES permitting program, and the annual Fish Consumption Advisory. As a result, the Assessment Branch operates on a rotating basin approach that is designed to sample, analyze, and assess one of the state's five (5) major river basins each year and to provide a statewide assessment every 5 years.

River Basin Monitoring Cycle

The five-year rotating river basin monitoring cycle began in 1996 and continues to be the basis for Indiana's Surface Water Quality Monitoring Strategy. The state of Indiana has been divided geographically into five major hydrological groupings or sampling units for the purpose of sampling, analysis and assessment. The five-year monitoring cycle listed below indicates the timeframes by which the IDEM plans to complete surface water quality surveys throughout the state.

Major River Basin	Sampling Year(s)
West Fork White River and Patoka River Basins	1996, 2001
East Fork White River and Whitewater River Basins	1997, 2002
Upper Wabash River Basin	1998, 2003
Lower Wabash River and Kankakee River Basins	1999, 2004
Great Lakes and Ohio River Basins	2000, 2005

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IDEM Assessment Branch Monitoring Programs

The Assessment Branch is composed of two sections that work together to collect data and assess the quality in Indiana's surface waters via the 305(b) report. These sections are as follows:

- **The Surveys Section** is responsible for collecting chemical and physical water quality data, assessing the quality of Indiana's river and streams, and determining the effect of approximately 1,800 permitted point sources on the rivers and streams of Indiana. The Surveys Section provides data for models, 305(b) water quality reports and wasteload allocations for NPDES permitting purposes, as well as an assessment of non-point sources. The OWQ biological and surface water monitoring programs identify stream reaches, watersheds or segments where physical, chemical and/or biological quality has been or would be impaired by either point or nonpoint sources. This information is used to help allocate waste loads equitably among various pollutant sources in a way that would ensure that water quality standards are met along stream reaches in each of the nearly 100 stream segments in Indiana.
- **The Biological Studies Section (BSS)** is responsible for determining the biological integrity of aquatic communities in Indiana lakes, rivers and streams. They do this through a variety of field, laboratory, and cooperative studies that involve several different forms of aquatic life as well as surface water and sediment chemistry, physical and habitat information. These data are used to determine compliance with the existing narrative biological criteria in the Indiana water quality standards, and form the basis for new specific numerical biological criteria. Additionally, the data determine the extent of ecological harm and recovery, and make correlations to physical and/or chemical impairments that may occur.

The BSS conducts fish tissue and sediment sampling to assess the level and extent of contamination by toxic and bioaccumulating substances whose concentrations in other environmental media are often too low to be easily measured with routine sampling and laboratory procedures. The fish tissue monitoring program provides the majority of data used to make decisions for Indiana's fish consumption advisories. In addition these data are also used for wildlife health risk assessments for fish-eating birds and mammals, and to provide the information needed to develop models to assess changes in Indiana ecosystems that affect aquatic life and human health.

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The BSS also oversees lake monitoring efforts conducted under contract by staff and students of the Indiana University School of Public and Environmental Affairs, as well as by a group of trained volunteer monitors. Both programs include the monitoring of physical, chemical and/or biological parameters useful in assessing the impacts of nutrients in Indiana lakes and reservoirs.

2. The Indiana Department of Natural Resources (IDNR) - Division of Fish and Wildlife

The IDNR Division of Fish and Wildlife maintains a network of fishery biologists that conduct research throughout the state to assess and manage fishery populations in Indiana's rivers, streams and lakes. The IDNR biologists routinely conduct macroinvertebrate sampling, electrofishing, netting surveys, and creel surveys to evaluate the status of local fisheries. The IDNR works cooperatively with the IDEM Biological Studies Section to assess the State's fisheries populations and to provide data to the Indiana State Board of Health to be used in the annual Fish Consumption Advisory.

The 303(d) List - Impaired Streams and Problem Pollutants

As a result of the waterbody assessments performed in the 305(b) process, a number of the rivers, streams, and lakes within the state are determined to be only partially supportive or non-supportive of each waterbody's designated uses. Section 303(d) of the CWA requires that waters not meeting or not expected to meet water quality standards after the implementation of regulatory controls (NPDES permits) to be compiled and listed as "impaired waters" by the IDEM. In other words, impaired waters are considered to be those waterbodies that don't meet the state's water quality standards for one or more designated uses.

Total Maximum Daily Loads (TMDL)

Based on Indiana's 2002 303(d) list, the streams listed in **Table 3-2** have been identified as having impairing pollutants by the IDEM. Streams identified on the state's 303(d) list are also required to undergo a planning process designed to reduce the amount of the pollutant coming from both point and nonpoint sources of pollution. This process is called Total Maximum Daily Loads (TMDL).

The IDEM defines a TMDL as "a process that leads to the quantification of the amount of a specific pollutant discharged into a waterbody that can be assimilated and still meet the water quality standards (designated uses)." This is achieved by specifying the amount of pollutant reductions necessary from point

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and non-point sources in order to meet the water quality standard set for an impairing pollutant. EPA is responsible for ensuring that TMDLs are completed by States and for approving the completed TMDLs.

IDEM's TMDL Strategy

Under the TMDL approach, states establish priorities and schedules for TMDL development. When TMDL development occurs, IDEM via the TMDL process determines the required reductions in pollutant loads or other actions needed to meet water quality goals. This process promotes a watershed approach driven by local needs and directed by the State's list of priority waterbodies. The overall goal in establishing the TMDL is to implement the pollutant reductions necessary from point and nonpoint sources of pollution that are necessary for a waterbody to meet water quality standards.

IDEM's Office of Water Quality has reorganized its work activities around a five year rotating basin schedule. The waters of the state have been grouped geographically into major river basins, and water quality data and other information will be collected and analyzed from each basin, or group of basins, once every five years. The schedule for implementing the TMDL Strategy is proposed to follow this rotating basin plan to the extent possible. Supplemental data collection (i.e. collection during a year other than the one prescribed in the IDEM's Surface Water Quality Monitoring Strategy) may also be required to complete the TMDL process.

IDEM's TMDL Strategy discusses activities to be accomplished in three phases. Phase One involves planning, sampling and data collection and will take place the first year. Phase Two involves TMDL development (water quality modeling) and will occur in the second year. Phase Three is the TMDL implementation period and is expected to occur during the third year; however, it is expected that some phases, especially the implementation of a TMDL, may take more than one year to fully accomplish.

The TMDL goals that are chosen in conjunction with watershed stakeholders during Phase Two will be used to develop a plan to implement the TMDL. During this process, stakeholder participation will be essential. IDEM's Basin Coordinator, in conjunction with the stakeholder groups, will develop a plan to implement the TMDL. Once the draft plan has been finalized through comments from stakeholder groups and IDEM, the plan becomes a "final draft" and is open to public review.